



## **Plantar Pressure and Shear Stress Reduction Insole for Diabetic Foot Ulceration**

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### **Abstract:**

The main purpose of this invention is to develop a new insole design which can significantly reduce the plantar pressure under the forefoot and heel, and can be used as replacement insole for the diabetic shoe, diabetic healing shoe, and removable cast walker.

This new insole is consisting of shock absorbing and shear reducing composite layers of Poron or soft EVA for the bottom layer, Plastazote or cushioned polymer gel for the middle layer, and a closed cell Neoprene top cover. These materials are commercially available in sheets.

The main advantage and uniqueness of this invention, comparing to other existing insoles, are the evenly spaced holes throughout the insole. The holes will significantly reduce the direct plantar pressure and shear stress dynamically exerting on the plantar skin upon loading. When there is a focal point of pressure, the holes will be distorted or stretched to the direction of the pressure which will also allow the insole material to be distorted or "give" resulting in reduction of the peak plantar pressure and the associated shear stress. This will also eliminate any pressure transferring problems as encountered in other insoles. Removing the pressure will allow the insole material to return back to the original state. Therefore, dynamic direct plantar pressure and shear stress can be significantly reduced by these holes.